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SEQUENCE LISTING

<110>   Lacour, Thierry
        Rether, Jan
        Freund, Annette
        Schmidt, Ralf-Michael
        Schaefer, Wilhelm
        Maier, Frank
        Malz, Sascha

<120>   Plasmid vectors for transformation of filamentous fungi

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<140>   US 10/519,210
<141>   2004-12-23

<150>   PCT/EP2003/007028
<151>   2003-07-02

<150>   EP 02015067.8
<151>   2002-07-05

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<151>   2003-04-11

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                165             170             175

gca gta cta cca aga gaa tct gcg caa gac cga ctt gac tca ttc atc   576
Ala Val Leu Pro Arg Glu Ser Ala Gln Asp Arg Leu Asp Ser Phe Ile
                180             185             190

att gaa atg gga ctt gct cga tca tca gtt cct tac atc agc tcg gtc   624
Ile Glu Met Gly Leu Ala Arg Ser Ser Val Pro Tyr Ile Ser Ser Val
        195             200             205

gca cat cac aac atg acc atc agt ggt cca cca tcc gtc ctc gaa aag   672
Ala His His Asn Met Thr Ile Ser Gly Pro Pro Ser Val Leu Glu Lys
        210             215             220

ttc att cac agt ata tca aca tca ccg aaa gat tct ctt cca gtg ccg   720
Phe Ile His Ser Ile Ser Thr Ser Pro Lys Asp Ser Leu Pro Val Pro
225             230             235             240

atc tat gct ccg tac cac gcc agc cat ctt tac agc atg gat gat gta   768
Ile Tyr Ala Pro Tyr His Ala Ser His Leu Tyr Ser Met Asp Asp Val
                245             250             255

gac gag gtc ctt agc ctg tct gca cct tct ttt gca tca gag tcc atc   816
Asp Glu Val Leu Ser Leu Ser Ala Pro Ser Phe Ala Ser Glu Ser Ile
                260             265             270

att cca ctc att tca agc tcc tcg ggt gac gag tta cag cca ctc aag   864
Ile Pro Leu Ile Ser Ser Ser Ser Gly Asp Glu Leu Gln Pro Leu Lys
                275             280             285

tat gca gat cta ctc cgc tgc tgt gtt agt gat atg ctc ata cag cca   912
Tyr Ala Asp Leu Leu Arg Cys Cys Val Ser Asp Met Leu Ile Gln Pro
        290             295             300

ctg gat ctt acc aag gtc tca caa gca gtg gcc cag ctt ctc gag gtt   960
Leu Asp Leu Thr Lys Val Ser Gln Ala Val Ala Gln Leu Leu Glu Val
305             310             315             320
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agc tca tct aca cgt gcc ata ata aag cct ata gca acc agc gtc tcc    1008
Ser Ser Ser Thr Arg Ala Ile Ile Lys Pro Ile Ala Thr Ser Val Ser
            325             330             335

aac agt cta gtg tct gtt ttg gag ccg acg cta gca gaa cga tgc gcc    1056
Asn Ser Leu Val Ser Val Leu Glu Pro Thr Leu Ala Glu Arg Cys Ala
            340             345             350

gtg gac aac agc atg ggg ccc aaa gcc tcg acc agc cac tca tca gca    1104
Val Asp Asn Ser Met Gly Pro Lys Ala Ser Thr Ser His Ser Ser Ala
            355             360             365

gag aca caa acc gag tca tca agc aag aac tcc aaa att gcg att gtt    1152
Glu Thr Gln Thr Glu Ser Ser Ser Lys Asn Ser Lys Ile Ala Ile Val
            370             375             380

gct atg tct ggt cgc ttt cca gac gca gct gac ttg agt gaa ttc tgg    1200
Ala Met Ser Gly Arg Phe Pro Asp Ala Ala Asp Leu Ser Glu Phe Trp
385             390             395             400

gat ctt ctc tac gaa ggt cgc gat gtt cat cga caa att ccc gag gac    1248
Asp Leu Leu Tyr Glu Gly Arg Asp Val His Arg Gln Ile Pro Glu Asp
            405             410             415

cga ttc aac gca gag ctc cat tac gac gct act ggg cga cgt aag aac    1296
Arg Phe Asn Ala Glu Leu His Tyr Asp Ala Thr Gly Arg Arg Lys Asn
            420             425             430

acc agc aag gtc atg aat ggc tgc ttc atc aag gaa cca gga ctg ttc    1344
Thr Ser Lys Val Met Asn Gly Cys Phe Ile Lys Glu Pro Gly Leu Phe
            435             440             445

gac gct agg ttc ttc aac atg tct cca aag gaa gct gag cag tcg gat    1392
Asp Ala Arg Phe Phe Asn Met Ser Pro Lys Glu Ala Glu Gln Ser Asp
            450             455             460

cct ggc cag cga atg gcc ctc gaa aca gct tac gag gcg ctt gag atg    1440
Pro Gly Gln Arg Met Ala Leu Glu Thr Ala Tyr Glu Ala Leu Glu Met
465             470             475             480

gct agt atc gta cca gac aga aca cct tcg aca cag aga gat cgt gtt    1488
Ala Ser Ile Val Pro Asp Arg Thr Pro Ser Thr Gln Arg Asp Arg Val
            485             490             495

ggt gtg ttc tac ggc atg act agc gat gat tgg aga gag gtc aac agt    1536
Gly Val Phe Tyr Gly Met Thr Ser Asp Asp Trp Arg Glu Val Asn Ser
            500             505             510

ggg cag aat gtc gac act tat ttt att cct ggt ggc aac aga gcg ttc    1584
Gly Gln Asn Val Asp Thr Tyr Phe Ile Pro Gly Gly Asn Arg Ala Phe
            515             520             525

act cct ggt cga ctc aac tac ttc ttc aag ttc agt ggg cct agc gct    1632
Thr Pro Gly Arg Leu Asn Tyr Phe Phe Lys Phe Ser Gly Pro Ser Ala
            530             535             540
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agt gtt gat acg gct tgc tcc tcc agt ctc gtt ggc ttg cac ttg gct   1680
Ser Val Asp Thr Ala Cys Ser Ser Ser Leu Val Gly Leu His Leu Ala
545             550             555             560

tgt aat tcc ctc tgg aga aat gat tgc gat aca gct att gcg ggc gga   1728
Cys Asn Ser Leu Trp Arg Asn Asp Cys Asp Thr Ala Ile Ala Gly Gly
                565             570             575

acc aat gtc atg act aac cct gac aac ttc gct ggt ttg gac cga ggc   1776
Thr Asn Val Met Thr Asn Pro Asp Asn Phe Ala Gly Leu Asp Arg Gly
            580             585             590

cac ttc cta tct aga acc ggc aac tgc aac acc ttt gac gat gga gca   1824
His Phe Leu Ser Arg Thr Gly Asn Cys Asn Thr Phe Asp Asp Gly Ala
            595             600             605

gac gga tac tgt cga gct gat ggc gtc gga acc atc atc ctc aag cgg   1872
Asp Gly Tyr Cys Arg Ala Asp Gly Val Gly Thr Ile Ile Leu Lys Arg
        610             615             620

ctt gag gac gcc gaa gct gac aat gac cct att ctc ggt gtc att ctg   1920
Leu Glu Asp Ala Glu Ala Asp Asn Asp Pro Ile Leu Gly Val Ile Leu
625             630             635             640

ggc gct tac aca aac cac tca gcc gaa gca gta tcc atc act cga cca   1968
Gly Ala Tyr Thr Asn His Ser Ala Glu Ala Val Ser Ile Thr Arg Pro
                645             650             655

cat gcc gga gct caa gag tac atc ttc tcc aaa ctc ctc cgt gag tcg   2016
His Ala Gly Ala Gln Glu Tyr Ile Phe Ser Lys Leu Leu Arg Glu Ser
            660             665             670

ggc acc gat ccc tac aac gtt agc tac atc gag atg cac ggc aca ggc   2064
Gly Thr Asp Pro Tyr Asn Val Ser Tyr Ile Glu Met His Gly Thr Gly
            675             680             685

act caa gcc ggc gac gca acc gag atg aca tcc gtc ctc aag acg ttt   2112
Thr Gln Ala Gly Asp Ala Thr Glu Met Thr Ser Val Leu Lys Thr Phe
    690             695             700

gct cct acc agc ggc ttc ggc ggt cga ttg cct cac caa aac ctt cac   2160
Ala Pro Thr Ser Gly Phe Gly Gly Arg Leu Pro His Gln Asn Leu His
705             710             715             720

ttg ggt tca gtc aag gcc aat gtc ggg cac ggt gaa tcc gca tct ggt   2208
Leu Gly Ser Val Lys Ala Asn Val Gly His Gly Glu Ser Ala Ser Gly
                725             730             735

atc att gct ctg atc aag acg ctg ctt atg atg gag aag aac atg atc   2256
Ile Ile Ala Leu Ile Lys Thr Leu Leu Met Met Glu Lys Asn Met Ile
            740             745             750

ccg ccg cat tgt ggt atc aag aca aag atc aat cac cat ttt cct acg   2304
Pro Pro His Cys Gly Ile Lys Thr Lys Ile Asn His His Phe Pro Thr
            755             760             765

gat ctc act cag cgc aat gtc cat atc gcc aaa gtt ccg aca tct tgg   2352
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    Asp Leu Thr Gln Arg Asn Val His Ile Ala Lys Val Pro Thr Ser Trp
        770             775             780

aca aga tcg ggt caa gcc aat cca cgc att gct ttc gtc aat aac ttc    2400
Thr Arg Ser Gly Gln Ala Asn Pro Arg Ile Ala Phe Val Asn Asn Phe
785             790             795             800

tct gcc gct ggt ggt aac tct gct gtc cta ctg caa gat gct cct cag    2448
Ser Ala Ala Gly Gly Asn Ser Ala Val Leu Leu Gln Asp Ala Pro Gln
                805             810             815

cca tcg gta gtt tcg gat gtt aca gac cct cgc aca tcc cat gtt gtc    2496
Pro Ser Val Val Ser Asp Val Thr Asp Pro Arg Thr Ser His Val Val
            820             825             830

act atg tcc gct cga tca gca gat tcc ctc agg aag aac ctc gcc aat    2544
Thr Met Ser Ala Arg Ser Ala Asp Ser Leu Arg Lys Asn Leu Ala Asn
            835             840             845

ctc aag gag ctt gta gaa ggc caa ggt gac tcg gag gtc ggc ttc ctg    2592
Leu Lys Glu Leu Val Glu Gly Gln Gly Asp Ser Glu Val Gly Phe Leu
        850             855             860

agc aag ctg tcc tac aca acc acc gcc agg cgc atg cat cat caa ttc    2640
Ser Lys Leu Ser Tyr Thr Thr Thr Ala Arg Arg Met His His Gln Phe
865             870             875             880

cga gct tcg gtc aca gca cag act cgt gaa cag ctg ctg aag ggc ctt    2688
Arg Ala Ser Val Thr Ala Gln Thr Arg Glu Gln Leu Leu Lys Gly Leu
                885             890             895

gat tcc gcc att gaa cgc cag gat gtg aag agg atc ccc gcc gcc gcg    2736
Asp Ser Ala Ile Glu Arg Gln Asp Val Lys Arg Ile Pro Ala Ala Ala
            900             905             910

ccc tct gtc ggc ttt gtg ttt agc ggc caa ggc gcc caa tac cgt ggt    2784
Pro Ser Val Gly Phe Val Phe Ser Gly Gln Gly Ala Gln Tyr Arg Gly
            915             920             925

atg ggc aag gag tac ttt aca tct ttc aca gcc ttc cgc tct gag atc    2832
Met Gly Lys Glu Tyr Phe Thr Ser Phe Thr Ala Phe Arg Ser Glu Ile
    930             935             940

atg tct tac gac agt atc gcc caa gcc caa ggc ttc ccg tca atc ctc    2880
Met Ser Tyr Asp Ser Ile Ala Gln Ala Gln Gly Phe Pro Ser Ile Leu
945             950             955             960

cca ctg atc cga gga gag gtg gaa gct gac tcg ttg agt cct gtt gag    2928
Pro Leu Ile Arg Gly Glu Val Glu Ala Asp Ser Leu Ser Pro Val Glu
            965             970             975

atc cag ctg ggt ctc act tgc ctg cag atg gca ctg gcc aag cta tgg    2976
Ile Gln Leu Gly Leu Thr Cys Leu Gln Met Ala Leu Ala Lys Leu Trp
            980             985             990

aag tca ttc ggt gtt gag cca ggc ttt gtt ctc gga cac agc tta ggc    3024
Lys Ser Phe Gly Val Glu Pro Gly Phe Val Leu Gly His Ser Leu Gly
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            995                 1000                1005

cac tat gct gct tta cac gtc gct ggt gtt ctg tcc gcc aat gat acc    3072
His Tyr Ala Ala Leu His Val Ala Gly Val Leu Ser Ala Asn Asp Thr
   1010                1015                1020

att tac ctc act ggc atc aga gcg cag ctg ctc gtg gat aag tgc cag    3120
Ile Tyr Leu Thr Gly Ile Arg Ala Gln Leu Leu Val Asp Lys Cys Gln
1025                1030                1035                1040

gca gga acc cac tca atg ctg gca gtg agg gca tcc tta cta cag atc    3168
Ala Gly Thr His Ser Met Leu Ala Val Arg Ala Ser Leu Leu Gln Ile
                1045                1050                1055

caa cag ttc ctc gat gcc aac att cac gag gtt gca tgt gtc aat ggt    3216
Gln Gln Phe Leu Asp Ala Asn Ile His Glu Val Ala Cys Val Asn Gly
                1060                1065                1070

tca cga gaa gtc gtc atc agt gga cgc gtt gcc gac att gac cag ctg    3264
Ser Arg Glu Val Val Ile Ser Gly Arg Val Ala Asp Ile Asp Gln Leu
           1075                1080                1085

gtt ggc ctt ttg tcg gct gac aac atc aag gcg acc cgc gtc aag gtg    3312
Val Gly Leu Leu Ser Ala Asp Asn Ile Lys Ala Thr Arg Val Lys Val
    1090                1095                1100

cca ttt gcc ttc cac tca gcg cag gtt gac ccc att ctc tcc gac ttg    3360
Pro Phe Ala Phe His Ser Ala Gln Val Asp Pro Ile Leu Ser Asp Leu
1105                1110                1115                1120

gat aca gcg gcg tcg cgc gtc acc ttc cac tcc ctc cag att cct gtt    3408
Asp Thr Ala Ala Ser Arg Val Thr Phe His Ser Leu Gln Ile Pro Val
                1125                1130                1135

ctt tgt gcc ctt gac agc tct gtc atc agc cct gga aac cat ggt gtc    3456
Leu Cys Ala Leu Asp Ser Ser Val Ile Ser Pro Gly Asn His Gly Val
                1140                1145                1150

att ggt ccc ctt cat cta cag cga cat tgt cgt gag aca gtc aac ttt    3504
Ile Gly Pro Leu His Leu Gln Arg His Cys Arg Glu Thr Val Asn Phe
           1155                1160                1165

gag ggt gct cta cat gct gcg gag cac gag aag atc atc aac aag aca    3552
Glu Gly Ala Leu His Ala Ala Glu His Glu Lys Ile Ile Asn Lys Thr
   1170                1175                1180

tca act cta tgg atc gag att ggt ccc cat gtt gtc tgc tct acc ttc    3600
Ser Thr Leu Trp Ile Glu Ile Gly Pro His Val Val Cys Ser Thr Phe
1185                1190                1195                1200

ctc aag tcc agc ctt ggt cca agc aca cct gct atc gca tcg ctt cgc    3648
Leu Lys Ser Ser Leu Gly Pro Ser Thr Pro Ala Ile Ala Ser Leu Arg
                1205                1210                1215

cga aat gac gat tgc tgg aag gtg ttg gct gat ggt ttg agc agt ctc    3696
Arg Asn Asp Asp Cys Trp Lys Val Leu Ala Asp Gly Leu Ser Ser Leu
                1220                1225                1230
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tac agc agc ggg ttg aca att gac ttg aac gag tat cat cgc gac ttc    3744
Tyr Ser Ser Gly Leu Thr Ile Asp Leu Asn Glu Tyr His Arg Asp Phe
        1235                1240                1245

aag gcc tct cac cag gta ctt cgt ctg cct tgt tac agc tgg gag cac    3792
Lys Ala Ser His Gln Val Leu Arg Leu Pro Cys Tyr Ser Trp Glu His
        1250                1255                1260

aag aat tac tgg ata cag tac aag tac gat tgg tcc ttg gct aaa ggt    3840
Lys Asn Tyr Trp Ile Gln Tyr Lys Tyr Asp Trp Ser Leu Ala Lys Gly
1265                1270                1275                1280

gat cct cca att gcc cct aac agc tcg gtt gaa gca gtc tca gct tta    3888
Asp Pro Pro Ile Ala Pro Asn Ser Ser Val Glu Ala Val Ser Ala Leu
                1285                1290                1295

tca aca ccc tcg gtc cag aag att cta cag gag act tcc ctt gat cag    3936
Ser Thr Pro Ser Val Gln Lys Ile Leu Gln Glu Thr Ser Leu Asp Gln
                1300                1305                1310

gta ttg act atc gtt gct gag aca gat ctc gcg agc cct cta ttg tca    3984
Val Leu Thr Ile Val Ala Glu Thr Asp Leu Ala Ser Pro Leu Leu Ser
        1315                1320                1325

gag gtt gcc caa ggt cat cgg gtc aac ggt gtc aaa gtc tgc aca tct    4032
Glu Val Ala Gln Gly His Arg Val Asn Gly Val Lys Val Cys Thr Ser
        1330                1335                1340

tcc gtg tac gct gat gtt ggc ttg acg ctg ggt aag tac att ttg gac    4080
Ser Val Tyr Ala Asp Val Gly Leu Thr Leu Gly Lys Tyr Ile Leu Asp
1345                1350                1355                1360

aac tac cgc acc gac tta gag ggt tat gcg gtc gat gtt cac ggt att    4128
Asn Tyr Arg Thr Asp Leu Glu Gly Tyr Ala Val Asp Val His Gly Ile
                1365                1370                1375

gag gtc cac aag cca ctt ctt ctc aaa gaa gac atg aac gga acg ccc    4176
Glu Val His Lys Pro Leu Leu Leu Lys Glu Asp Met Asn Gly Thr Pro
                1380                1385                1390

cag gct aca ccg ttc cgc atc gaa gtg cga tac cca atc cag agc acc    4224
Gln Ala Thr Pro Phe Arg Ile Glu Val Arg Tyr Pro Ile Gln Ser Thr
        1395                1400                1405

acg gcg ctg atg agc atc tcc acc act ggc ccc aac ggt cag cac atc    4272
Thr Ala Leu Met Ser Ile Ser Thr Thr Gly Pro Asn Gly Gln His Ile
        1410                1415                1420

aag cat gct aac tgc gaa ctt cga ctc gag cat ccg tcg caa tgg gaa    4320
Lys His Ala Asn Cys Glu Leu Arg Leu Glu His Pro Ser Gln Trp Glu
1425                1430                1435                1440

gcg gag tgg gat cgc caa gcc tac ctc atc aat cgc agc gtc aac tgc    4368
Ala Glu Trp Asp Arg Gln Ala Tyr Leu Ile Asn Arg Ser Val Asn Cys
                1445                1450                1455
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ctt ctg cag cga tca gca caa ggt ttg gac agc atg ttg gca acc gga      4416
Leu Leu Gln Arg Ser Ala Gln Gly Leu Asp Ser Met Leu Ala Thr Gly
        1460                1465                1470

atg gtc tac aag gtc ttc tcc tcc ctc gtc gac tat gcc gat ggc tac      4464
Met Val Tyr Lys Val Phe Ser Ser Leu Val Asp Tyr Ala Asp Gly Tyr
        1475                1480                1485

aag ggt ctg cag gag gtt gtc ttg cac agc caa gag ctc gag ggc aca      4512
Lys Gly Leu Gln Glu Val Val Leu His Ser Gln Glu Leu Glu Gly Thr
        1490                1495                1500

gca aaa gtg cgc ttc caa act ccc tcg gga ggt ttc gtc tgc aat ccc      4560
Ala Lys Val Arg Phe Gln Thr Pro Ser Gly Gly Phe Val Cys Asn Pro
1505                1510                1515                1520

atg tgg att gac agc tgt ggt cag acg acc ggc ttc atg atg aac tgt      4608
Met Trp Ile Asp Ser Cys Gly Gln Thr Thr Gly Phe Met Met Asn Cys
                1525                1530                1535

cat cag act acg ccc aat gac tac gtc tac gtc aat cat ggc tgg aag      4656
His Gln Thr Thr Pro Asn Asp Tyr Val Tyr Val Asn His Gly Trp Lys
            1540                1545                1550

tcg atg aga ttg gcc aag gcg ttc cgt gaa gat ggt acc tat cgg act      4704
Ser Met Arg Leu Ala Lys Ala Phe Arg Glu Asp Gly Thr Tyr Arg Thr
        1555                1560                1565

tat atc cgg atg agg ccc att gat agc acc aag ttc gct ggt gac ttg      4752
Tyr Ile Arg Met Arg Pro Ile Asp Ser Thr Lys Phe Ala Gly Asp Leu
    1570                1575                1580

tac att ctt gat gag gat gac act gtg gtt ggt gtt tat gga gac ata      4800
Tyr Ile Leu Asp Glu Asp Asp Thr Val Val Gly Val Tyr Gly Asp Ile
1585                1590                1595        -        1600

aca ttc caa ggt ttg ccg cga cga gtt ctc aac aca gtc ttg cca tct      4848
Thr Phe Gln Gly Leu Pro Arg Arg Val Leu Asn Thr Val Leu Pro Ser
                1605                1610                1615

gcc aac gcg gtt cca gtt gat gct ccc atg ggt cga cgg gac gtg cct      4896
Ala Asn Ala Val Pro Val Asp Ala Pro Met Gly Arg Arg Asp Val Pro
            1620                1625                1630

cca tca aga atg gat gtg cct ccc gtc agg tcc ggt gaa ggg cca ccc      4944
Pro Ser Arg Met Asp Val Pro Pro Val Arg Ser Gly Glu Gly Pro Pro
        1635                1640                1645

act tca gca ccc acg cag caa gct atc gct ctg ccg ttc gca gcc gat      4992
Thr Ser Ala Pro Thr Gln Gln Ala Ile Ala Leu Pro Phe Ala Ala Asp
    1650                1655                1660

aca tcc atg gac tcc cga ttg aga cct ctt ctt cgc atc ttg tca gaa      5040
Thr Ser Met Asp Ser Arg Leu Arg Pro Leu Leu Arg Ile Leu Ser Glu
1665                1670                1675                1680

gag atc ggt ctc ggt ctt gac gtt ctt tcg gac gat gaa ctc gac ttt      5088
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Glu Ile Gly Leu Gly Leu Asp Val Leu Ser Asp Asp Glu Leu Asp Phe
            1685                 1690                 1695


gcg gac cac ggt gtc gac tca ctc ctc tca ttg acc atc act ggt cgc   5136
Ala Asp His Gly Val Asp Ser Leu Leu Ser Leu Thr Ile Thr Gly Arg
            1700             1705                 1710


atg cgt gag gaa ttg ggt ctc gac gtt gaa tct aca gca ttc atg aac   5184
Met Arg Glu Glu Leu Gly Leu Asp Val Glu Ser Thr Ala Phe Met Asn
            1715                 1720             1725


tgt ccc act ttg ggc agc ttt aaa ttg ttc cta gga ctt gtc gat cag   5232
Cys Pro Thr Leu Gly Ser Phe Lys Leu Phe Leu Gly Leu Val Asp Gln
        1730             1735                 1740


gac aat aag ggc agc agc ggc agt gat ggc agt ggt agg agc agt cca   5280
Asp Asn Lys Gly Ser Ser Gly Ser Asp Gly Ser Gly Arg Ser Ser Pro
1745                 1750                 1755                 1760


gca ccg ggt acc gag tct ggc gct act aca cca cct atg agc gaa gag   5328
Ala Pro Gly Thr Glu Ser Gly Ala Thr Thr Pro Pro Met Ser Glu Glu
                    1765                 1770                 1775


gac cag gac aag ata gtc agc agt cac tcg ctt cac cag ttc caa gcc   5376
Asp Gln Asp Lys Ile Val Ser Ser His Ser Leu His Gln Phe Gln Ala
                1780                 1785                 1790


agt tcg acg ctt cta cag ggc agt ccc agt aaa gct cgc tcg act ttg   5424
Ser Ser Thr Leu Leu Gln Gly Ser Pro Ser Lys Ala Arg Ser Thr Leu
            1795                 1800                 1805


ttc ttg cta cca gat ggc tcg gga tct gcc aca tcc tac gct tcc ctt   5472
Phe Leu Leu Pro Asp Gly Ser Gly Ser Ala Thr Ser Tyr Ala Ser Leu
        1810                 1815                 1820


ccc ccg atc tct cca gac gga gat gtt gct gtc tac ggg ttg aac tgt   5520
Pro Pro Ile Ser Pro Asp Gly Asp Val Ala Val Tyr Gly Leu Asn Cys
1825                 1830                 1835                 1840


cca tgg ctg aag gac tct agt tac ctc gtc gag ttt gga ctc aag ggc   5568
Pro Trp Leu Lys Asp Ser Ser Tyr Leu Val Glu Phe Gly Leu Lys Gly
            1845                 1850                 1855


ttg aca gag ctc tat gtc aac gag ata ctc cgt cgc aag cca cag ggt   5616
Leu Thr Glu Leu Tyr Val Asn Glu Ile Leu Arg Arg Lys Pro Gln Gly
            1860                 1865                 1870


cct tac aat ttg gga gga tgg tca gcc ggt ggc att tgc gct tat gaa   5664
Pro Tyr Asn Leu Gly Gly Trp Ser Ala Gly Gly Ile Cys Ala Tyr Glu
            1875                 1880                 1885


gct gcc ctg atc ctc acc aga gca gga cac caa gtc gat cgc ctt atc   5712
Ala Ala Leu Ile Leu Thr Arg Ala Gly His Gln Val Asp Arg Leu Ile
            1890                 1895                 1900


ttg att gac tct ccc aat ccc gtt ggt ctt gag aag cta cct cct cgc   5760
Leu Ile Asp Ser Pro Asn Pro Val Gly Leu Glu Lys Leu Pro Pro Arg
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1905   1910   1915   1920

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ttg tac gat ttc ctc aat tcg cag aat gtc ttt gga tca gac aac ccg   5808
Leu Tyr Asp Phe Leu Asn Ser Gln Asn Val Phe Gly Ser Asp Asn Pro
        1925            1930            1935

cac agc act gct gga aca agc gtc aaa gct cca gaa tgg ctt ctt gca   5856
His Ser Thr Ala Gly Thr Ser Val Lys Ala Pro Glu Trp Leu Leu Ala
        1940            1945            1950

cat ttc ctg gcc ttc att gac gct ctg gat gct tat gtc gca gtg cct   5904
His Phe Leu Ala Phe Ile Asp Ala Leu Asp Ala Tyr Val Ala Val Pro
        1955            1960            1965

tgg gac tct ggt cta gtc ggt cta gca tca ccg ctc cct gca ccg ccg   5952
Trp Asp Ser Gly Leu Val Gly Leu Ala Ser Pro Leu Pro Ala Pro Pro
      1970            1975            1980

cag aca tac atg ctg tgg gca gaa gac gga gtt tgc aaa gac tct gat   6000
Gln Thr Tyr Met Leu Trp Ala Glu Asp Gly Val Cys Lys Asp Ser Asp
1985            1990.             . 1995            2000

agt gct cgt ccc gag tac cgt gac gat gac cca cgc gag atg aga tgg   6048
Ser Ala Arg Pro Glu Tyr Arg Asp Asp Asp Pro Arg Glu Met Arg Trp
            2005            2010            2015

ctg ttg gag aac aga aca aac ttt ggt ccg aat ggt tgg gag gcg cta   6096
Leu Leu Glu Asn Arg Thr Asn Phe Gly Pro Asn Gly Trp Glu Ala Leu
        2020            2025            2030

ctt ggt ggt aaa gag ggt ttg ttc atg gat cgg att gcg gaa gcg aat   6144
Leu Gly Gly Lys Glu Gly Leu Phe Met Asp Arg Ile Ala Glu Ala Asn
        2035            2040            2045

cat ttt agt atg ttg aag aga gga cgg aat gcg gaa tat gtc tct gca   6192
His Phe Ser Met Leu Lys Arg Gly Arg Asn Ala Glu Tyr Val Ser Ala
    2050            2055            2060

ttc ctg gct cgg gcc ttg gac aat tag                               6219
Phe Leu Ala Arg Ala Leu Asp Asn
2065            2070
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<210> 6
<211> 2072
<212> PRT
<213> Fusarium graminearum

<400> 6
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Met Thr Pro Ser Met Met Glu Val Phe Val Phe Gly Asp Gln Ser Thr
 1               5                  10                  15

Arg Phe Ala Pro Pro Leu Lys Asp Leu Leu Leu Lys Gly Asn Ser Pro
            20                  25                  30

Tyr Leu Thr His Phe Val Lys Gln Val His Ala Leu Leu Arg Arg Glu
        35                  40                  45
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Ile Ser Ser Leu Pro Ala Val Gln Gln Lys Leu Phe Pro Asn Phe Ala
    50                  55                  60

Asp Ile Gln Glu Leu Val Ser Lys Ser Asp Trp Gly Ser Gly Asn Pro
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Ala Leu Thr Ser Ala Leu Ala Cys Phe Tyr His Leu Cys Ser Phe Ile
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His Phe Tyr Asp Gly Gln Gly Arg Thr Phe Pro Ser Glu Asn Ser Arg
            100                 105                 110

Ile Ile Gly Leu Cys Val Gly Ser Leu Ala Ala Thr Ala Val Ser Cys
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Ser Thr Ser Leu Ser Glu Leu Val Ser Ala Gly Val Asp Ala Val Arg
    130                 135                 140

Val Ala Leu His Val Gly Leu Arg Val Trp Arg Thr Thr Ser Leu Phe
145                 150                 155                 160

Asp Val Pro Asp Arg Pro Ser Ala Thr Trp Phe Ile Ile Val Pro Glu
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Ala Val Leu Pro Arg Glu Ser Ala Gln Asp Arg Leu Asp Ser Phe Ile
            180                 185                 190

Ile Glu Met Gly Leu Ala Arg Ser Ser Val Pro Tyr Ile Ser Ser Val
        195                 200                 205

Ala His His Asn Met Thr Ile Ser Gly Pro Pro Ser Val Leu Glu Lys
    210                 215                 220

Phe Ile His Ser Ile Ser Thr Ser Pro Lys Asp Ser Leu Pro Val Pro
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Ile Tyr Ala Pro Tyr His Ala Ser His Leu Tyr Ser Met Asp Asp Val
            245                 250                 255

Asp Glu Val Leu Ser Leu Ser Ala Pro Ser Phe Ala Ser Glu Ser Ile
            260                 265                 270

Ile Pro Leu Ile Ser Ser Ser Ser Gly Asp Glu Leu Gln Pro Leu Lys
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Tyr Ala Asp Leu Leu Arg Cys Cys Val Ser Asp Met Leu Ile Gln Pro
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Leu Asp Leu Thr Lys Val Ser Gln Ala Val Ala Gln Leu Leu Glu Val
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Ser Ser Ser Thr Arg Ala Ile Ile Lys Pro Ile Ala Thr Ser Val Ser
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Asn Ser Leu Val Ser Val Leu Glu Pro Thr Leu Ala Glu Arg Cys Ala
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Glu Thr Gln Thr Glu Ser Ser Ser Lys Asn Ser Lys Ile Ala Ile Val
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Ala Met Ser Gly Arg Phe Pro Asp Ala Ala Asp Leu Ser Glu Phe Trp
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Asp Leu Leu Tyr Glu Gly Arg Asp Val His Arg Gln Ile Pro Glu Asp
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Arg Phe Asn Ala Glu Leu His Tyr Asp Ala Thr Gly Arg Arg Lys Asn
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Thr Ser Lys Val Met Asn Gly Cys Phe Ile Lys Glu Pro Gly Leu Phe
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Asp Ala Arg Phe Phe Asn Met Ser Pro Lys Glu Ala Glu Gln Ser Asp
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Pro Gly Gln Arg Met Ala Leu Glu Thr Ala Tyr Glu Ala Leu Glu Met
465             470             475                     480

Ala Ser Ile Val Pro Asp Arg Thr Pro Ser Thr Gln Arg Asp Arg Val
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Gly Val Phe Tyr Gly Met Thr Ser Asp Asp Trp Arg Glu Val Asn Ser
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Gly Gln Asn Val Asp Thr Tyr Phe Ile Pro Gly Gly Asn Arg Ala Phe
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Thr Pro Gly Arg Leu Asn Tyr Phe Phe Lys Phe Ser Gly Pro Ser Ala
        530             535             540

Ser Val Asp Thr Ala Cys Ser Ser Ser Leu Val Gly Leu His Leu Ala
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Cys Asn Ser Leu Trp Arg Asn Asp Cys Asp Thr Ala Ile Ala Gly Gly
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Thr Asn Val Met Thr Asn Pro Asp Asn Phe Ala Gly Leu Asp Arg Gly
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His Phe Leu Ser Arg Thr Gly Asn Cys Asn Thr Phe Asp Asp Gly Ala
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Asp Gly Tyr Cys Arg Ala Asp Gly Val Gly Thr Ile Ile Leu Lys Arg
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Leu Glu Asp Ala Glu Ala Asp Asn Asp Pro Ile Leu Gly Val Ile Leu
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Gly Ala Tyr Thr Asn His Ser Ala Glu Ala Val Ser Ile Thr Arg Pro
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Gly Thr Asp Pro Tyr Asn Val Ser Tyr Ile Glu Met His Gly Thr Gly
        675   680   685

Thr Gln Ala Gly Asp Ala Thr Glu Met Thr Ser Val Leu Lys Thr Phe
    690   695   700

Ala Pro Thr Ser Gly Phe Gly Gly Arg Leu Pro His Gln Asn Leu His
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Leu Gly Ser Val Lys Ala Asn Val Gly His Gly Glu Ser Ala Ser Gly
            725   730   735

Ile Ile Ala Leu Ile Lys Thr Leu Leu Met Met Glu Lys Asn Met Ile
        740   745   750

Pro Pro His Cys Gly Ile Lys Thr Lys Ile Asn His His Phe Pro Thr
        755   760   765

Asp Leu Thr Gln Arg Asn Val His Ile Ala Lys Val Pro Thr Ser Trp
    770   775   780

Thr Arg Ser Gly Gln Ala Asn Pro Arg Ile Ala Phe Val Asn Asn Phe
785   790   795   800

Ser Ala Ala Gly Gly Asn Ser Ala Val Leu Leu Gln Asp Ala Pro Gln
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Pro Ser Val Val Ser Asp Val Thr Asp Pro Arg Thr Ser His Val Val
            820   825   830

Thr Met Ser Ala Arg Ser Ala Asp Ser Leu Arg Lys Asn Leu Ala Asn
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Leu Lys Glu Leu Val Glu Gly Gln Gly Asp Ser Glu Val Gly Phe Leu
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Ser Lys Leu Ser Tyr Thr Thr Thr Ala Arg Arg Met His His Gln Phe
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Arg Ala Ser Val Thr Ala Gln Thr Arg Glu Gln Leu Leu Lys Gly Leu
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Asp Ser Ala Ile Glu Arg Gln Asp Val Lys Arg Ile Pro Ala Ala Ala
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Pro Ser Val Gly Phe Val Phe Ser Gly Gln Gly Ala Gln Tyr Arg Gly
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Met Gly Lys Glu Tyr Phe Thr Ser Phe Thr Ala Phe Arg Ser Glu Ile
    930   935   940

Met Ser Tyr Asp Ser Ile Ala Gln Ala Gln Gly Phe Pro Ser Ile Leu
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Pro Leu Ile Arg Gly Glu Val Glu Ala Asp Ser Leu Ser Pro Val Glu
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Ile Gln Leu Gly Leu Thr Cys Leu Gln Met Ala Leu Ala Lys Leu Trp
            980   985   990

Lys Ser Phe Gly Val Glu Pro Gly Phe Val Leu Gly His Ser Leu Gly
            995   1000   1005

His Tyr Ala Ala Leu His Val Ala Gly Val Leu Ser Ala Asn Asp Thr
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Ile Tyr Leu Thr Gly Ile Arg Ala Gln Leu Leu Val Asp Lys Cys Gln
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Ala Gly Thr His Ser Met Leu Ala Val Arg Ala Ser Leu Leu Gln Ile
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Gln Gln Phe Leu Asp Ala Asn Ile His Glu Val Ala Cys Val Asn Gly
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Ser Arg Glu Val Val Ile Ser Gly Arg Val Ala Asp Ile Asp Gln Leu
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Val Gly Leu Leu Ser Ala Asp Asn Ile Lys Ala Thr Arg Val Lys Val
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Pro Phe Ala Phe His Ser Ala Gln Val Asp Pro Ile Leu ·Ser Asp Leu
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Asp Thr Ala Ala Ser Arg Val Thr Phe His Ser Leu Gln Ile Pro Val
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Leu Cys Ala Leu Asp Ser Ser Val Ile Ser Pro Gly Asn His Gly Val
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Ile Gly Pro Leu His Leu Gln Arg His Cys Arg Glu Thr Val Asn Phe
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Glu Gly Ala Leu His Ala Ala Glu His Glu Lys Ile Ile Asn Lys Thr
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Ser Thr Leu Trp Ile Glu Ile Gly Pro His Val Val Cys Ser Thr Phe
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Leu Lys Ser Ser Leu Gly Pro Ser Thr Pro Ala Ile Ala Ser Leu Arg
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Arg Asn Asp Asp Cys Trp Lys Val Leu Ala Asp Gly Leu Ser Ser Leu
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Tyr Ser Ser Gly Leu Thr Ile Asp Leu Asn Glu Tyr His Arg Asp Phe
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Lys Ala Ser His Gln Val Leu Arg Leu Pro Cys Tyr Ser Trp Glu His
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Lys Asn Tyr Trp Ile Gln Tyr Lys Tyr Asp Trp Ser Leu Ala Lys Gly
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Asp Pro Pro Ile Ala Pro Asn Ser Ser Val Glu Ala Val Ser Ala Leu
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Ser Thr Pro Ser Val Gln Lys Ile Leu Gln Glu Thr Ser Leu Asp Gln
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Val Leu Thr Ile Val Ala Glu Thr Asp Leu Ala Ser Pro Leu Leu Ser
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Glu Val Ala Gln Gly His Arg Val Asn Gly Val Lys Val Cys Thr Ser
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Ser Val Tyr Ala Asp Val Gly Leu Thr Leu Gly Lys Tyr Ile Leu Asp
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Asn Tyr Arg Thr Asp Leu Glu Gly Tyr Ala Val Asp Val His Gly Ile
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Glu Val His Lys Pro Leu Leu Leu Lys Glu Asp Met Asn Gly Thr Pro
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Gln Ala Thr Pro Phe Arg Ile Glu Val Arg Tyr Pro Ile Gln Ser Thr
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Thr Ala Leu Met Ser Ile Ser Thr Thr Gly Pro Asn Gly Gln His Ile
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Lys His Ala Asn Cys Glu Leu Arg Leu Glu His Pro Ser Gln Trp Glu
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Ala Glu Trp Asp Arg Gln Ala Tyr Leu Ile Asn Arg Ser Val Asn Cys
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Leu Leu Gln Arg Ser Ala Gln Gly Leu Asp Ser Met Leu Ala Thr Gly
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Met Val Tyr Lys Val Phe Ser Ser Leu Val Asp Tyr Ala Asp Gly Tyr
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Lys Gly Leu Gln Glu Val Val Leu His Ser Gln Glu Leu Glu Gly Thr
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Ala Lys Val Arg Phe Gln Thr Pro Ser Gly Gly Phe Val Cys Asn Pro
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Met Trp Ile Asp Ser Cys Gly Gln Thr Thr Gly Phe Met Met Asn Cys
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His Gln Thr Thr Pro Asn Asp Tyr Val Tyr Val Asn His Gly Trp Lys
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Ser Met Arg Leu Ala Lys Ala Phe Arg Glu Asp Gly Thr Tyr Arg Thr
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Tyr Ile Arg Met Arg Pro Ile Asp Ser Thr Lys Phe Ala Gly Asp Leu
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Tyr Ile Leu Asp Glu Asp Asp Thr Val Val Gly Val Tyr Gly Asp Ile
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Thr Phe Gln Gly Leu Pro Arg Arg Val Leu Asn Thr Val Leu Pro Ser
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Ala Asn Ala Val Pro Val Asp Ala Pro Met Gly Arg Arg Asp Val Pro
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Pro Ser Arg Met Asp Val Pro Pro Val Arg Ser Gly Glu Gly Pro Pro
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Thr Ser Met Asp Ser Arg Leu Arg Pro Leu Leu Arg Ile Leu Ser Glu
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Glu Ile Gly Leu Gly Leu Asp Val Leu Ser Asp Asp Glu Leu Asp Phe
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Ala Asp His Gly Val Asp Ser Leu Leu Ser Leu Thr Ile Thr Gly Arg
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Cys Pro Thr Leu Gly Ser Phe Lys Leu Phe Leu Gly Leu Val Asp Gln
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Asp Asn Lys Gly Ser Ser Gly Ser Asp Gly Ser Gly Arg Ser Ser Pro
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Asp Gln Asp Lys Ile Val Ser Ser His Ser Leu His Gln Phe Gln Ala
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Ser Ser Thr Leu Leu Gln Gly Ser Pro Ser Lys Ala Arg Ser Thr Leu
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Phe Leu Leu Pro Asp Gly Ser Gly Ser Ala Thr Ser Tyr Ala Ser Leu
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Pro Pro Ile Ser Pro Asp Gly Asp Val Ala Val Tyr Gly Leu Asn Cys
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Pro Trp Leu Lys Asp Ser Ser Tyr Leu Val Glu Phe Gly Leu Lys Gly
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Pro Tyr Asn Leu Gly Gly Trp Ser Ala Gly Gly Ile Cys Ala Tyr Glu
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Ala Ala Leu Ile Leu Thr Arg Ala Gly His Gln Val Asp Arg Leu Ile
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Leu Ile Asp Ser Pro Asn Pro Val Gly Leu Glu Lys Leu Pro Pro Arg
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Leu Tyr Asp Phe Leu Asn Ser Gln Asn Val Phe Gly Ser Asp Asn Pro
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His Ser Thr Ala Gly Thr Ser Val Lys Ala Pro Glu Trp Leu Leu Ala
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His Phe Leu Ala Phe Ile Asp Ala Leu Asp Ala Tyr Val Ala Val Pro
          1955              1960              1965

Trp Asp Ser Gly Leu Val Gly Leu Ala Ser Pro Leu Pro Ala Pro Pro
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Gln Thr Tyr Met Leu Trp Ala Glu Asp Gly Val Cys Lys Asp Ser Asp
1985              1990              1995              2000

Ser Ala Arg Pro Glu Tyr Arg Asp Asp Asp Pro Arg Glu Met Arg Trp
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Leu Leu Glu Asn Arg Thr Asn Phe Gly Pro Asn Gly Trp Glu Ala Leu
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Leu Gly Gly Lys Glu Gly Leu Phe Met Asp Arg Ile Ala Glu Ala Asn
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Gly Leu His Leu Ala Cys Asn Ser Leu Trp Arg Asn Asp Cys Asp Thr
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Gly Leu Asp Arg Gly His Phe Leu Ser Arg Thr Gly
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Gly Leu His Leu Ala Cys Asn Ser Leu Trp Arg Asn Asp Cys Asp Thr
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Ala Ile Ala Gly Gly Thr Asn Val Met Thr Asn Pro Asp Asn Phe Ala
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Gly Leu Asp Arg Gly His Phe Leu Ser Arg Thr Gly
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Phe Leu Glu Arg Ala Gly Glu Ala Val Arg Phe Glu Asn Gln Asn Arg
        35                  40                  45

Ser His Pro Ser Lys Ala Val Pro Asn Phe Ser Thr Ile Gln Glu Leu
    50                  55                  60

Val Asp Arg Tyr Tyr Arg Gly Asp Ala Lys Asp Ala Ala Thr Glu Ser
65                  70                  75                  80

Ala Leu Val Cys Ile Ser Gln Phe Cys His Phe Ile Gly Ala Phe Glu
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Glu Arg Arg Pro Ser Tyr Ile Gln Pro Asn Ser Asp Ala Arg Leu Val
            100                 105                 110

Gly Leu Cys Thr Gly Leu Ile Ala Ala Thr Ala Val Ala Ala Ser Asp
            115                 120                 125

Ser Leu Thr Ala Leu Ile Pro Leu Ala Val Glu Ala Val Arg Ile Ala
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Phe Arg Ala Gly Ala His Val Gly Lys Val Ala Gln Gln Thr Glu Cys
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Asp Ser Lys Thr Gln Ser Trp Ser Thr Ile Val Ala Ala Asp Glu Lys
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Pro Ile Asn Gln Leu Trp Ile Ser Val Ser Ser Ala Thr Ser Val Thr
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Ile Ser Val Pro Pro Trp Thr Lys Ala Arg Leu Xaa Glu Glu Ser Glu
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Phe Phe Arg Thr Gln Lys Ser Ala Pro Val Ser Ile Phe Ala Pro Tyr
225                 230                 235                 240

His Ala Ser His Xaa His Ser Gln Ser Asp Leu Asp Lys Ile Leu Arg
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Pro Gln Thr Lys Thr Ile Phe Gly Asn Thr Thr Val Arg Phe Pro Val
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Leu Leu Gln Ala Ala Leu Lys Glu Ile Ile Ile Asp Pro Leu Arg Trp
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Asp Lys Val Leu Lys Tyr Cys Ala Ala Gly Lys Ala Ser Glu Ala Lys
305   310   315   320

Val Phe Ala Val Gly Pro Thr Asn Leu Ala Ser Ser Val Val Ser Ala
            325   330   335

Leu Lys Ala Ser Thr Thr Lys Val Thr Leu Glu Asp His Ser Thr Trp
            340   345   350

Ser Thr Val Pro Pro Gln Gly Thr Arg His Ser Lys Arg Glu Ala Asp
            355   360   365

Ile Ala Ile Val Gly Phe Ser Gly Arg Phe Pro Asp Ala Ala Asp Asn
    370   375   380

Glu Leu Phe Trp Gln Leu Leu Glu Arg Gly Leu Asp Val His Arg Pro
385   390   395   400

Val Pro Pro Asp Arg Phe Pro Val Glu Ser His Thr Asp Pro Ser Gly
            405   410   415

Lys Lys Lys Asn Thr Ser His Thr Pro Phe Gly Asn Phe Ile Glu Lys
            420   425   430

Pro Gly Leu Phe Asp Ala Arg Phe Phe Asn Met Ser Pro Arg Glu Ala
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Ala Gln Thr Asp Pro Met Gln Arg Leu Met Leu Thr Thr Gly Tyr Xaa
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Ala Met Glu Met Ala Gly Ile Val Pro Gly Xaa Thr Pro Ser Thr Xaa
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His Asp Arg Ile Gly Thr Phe Tyr Gly Gln Thr Ser Xaa Xaa Trp Arg
            485   490   495

Glu Val Asn Ala Ala Xaa Asp Ile Asp Thr Tyr Phe Ile Ser Gly Gly
            500   505   510

Val Arg Ala Phe Gly Pro Gly Xaa Ile Asn Tyr Phe Phe Lys Phe Ser
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Gly Pro Xaa Phe Ser Val Asp Met Xaa Ala Asn Pro Ala Trp Pro Xaa
    530   535   540

Met Asn Val Ala Ile Thr Ser Leu Arg Ala Asn Glu Cys Asp Thr Val
545   550   555   560

Phe Thr Gly Gly Ala Asn Val Leu Thr Asn Ser Asp Ile Phe Ser Gly
            565   570   575

Leu Ser Arg Gly His Phe Leu Ser Lys Thr Gly Ser Cys Lys Thr Trp
        580   585   590

Asp Asn Asp Ala Asp Gly Tyr Cys Arg Gly Asp Gly Val Cys Thr Val
        595   600   605

Ile Met Lys Arg Leu Asp Asp Ala Leu Ala Asp Arg Asp Pro Val Leu
    610   615   620

Gly Val Ile Arg Gly Ile Gly Thr Asn His Ser Ala Glu Ala Val Ser
625   630   635   640

Ile Thr His Pro Cys Ala Glu Asn Gln Ala Phe Leu Phe Asp Lys Val
            645   650   655

Leu Lys Glu Cys Asn Val His Cys Asn Asp Val Asn Tyr Val Glu Met
        660   665   670

His Gly Thr Gly Thr Gln Ala Gly Asp Gly Ile Glu Met Glu Ser Val
        675   680   685

Ser Ser Val Phe Ala Pro Arg Gln Pro Arg Arg Arg Pro Asp Gln Pro
    690   695   700

Leu Tyr Val Gly Ala Val Lys Ser Asn Ile Gly His Gly Glu Ala Val
705   710   715   720

Ser Gly Val Ser Ala Leu Ile Lys Val Leu Leu Met Leu Gln Lys Asn
            725   730   735

Lys Ile Pro Pro His Thr Gly Ile Lys Lys Gln Ile Asn Lys Asn Phe
        740   745   750

Ala Pro Asp Leu Lys Glu Arg Asn Val Asn Ile Ala Phe Gln Thr Thr
        755   760   765

Pro Phe Pro Arg Pro Pro Gly Gly Lys Arg Thr Val Phe Ile Asn Asn
    770   775   780

Phe Ser Ala Ala Gly Gly Asn Thr Ala Met Leu Leu Gln Asp Gly Pro
785   790   795   800

Glu Val Pro Thr Glu Pro Ser Ser Asp Pro Arg Ser Thr His Val Val
            805   810   815

Thr Xaa Ser Ala Lys Ser Leu Ala Ala Phe Lys Arg Thr Leu Ala Lys
        820   825   830

Tyr Glu Ala Tyr Leu Asn Ala His Pro Asn Val Gly Leu Pro Asp Leu
        835   840   845

Ala Tyr Thr Val Thr Ala Arg Arg Ala His Tyr Ser Leu Pro Arg Arg
    850   855   860

Phe Pro Val Gln Ser Ile Ser Gln Leu Gln Ala Ser Leu Arg Ala Ile
865   870   875   880

Gln Asp Gln Thr His Asn Pro Ile Pro Leu Ala Ser Pro Gln Ile Ala
                885   890   895

Met Ala Phe Thr Gly Gln Gly Ser Gln Tyr Thr Gly Met Gly Gln Lys
            900   905   910

Leu Phe Glu Thr Ser Lys Gln Phe Arg Gln Asp Ile Glu Glu Phe Asn
        915   920   925

Glu Ile Ala Leu Arg Gln Gly Leu Pro Ser Ile Met Pro Leu Ile Asp
    930   935   940

Gly Ser Val Glu Val Gln His Leu Pro Pro Thr Val Val Gln Leu Gly
945   950   955   960

Met Cys Cys Ile Gln Met Ala Leu Thr His Leu Trp Ser Thr Trp Gly
            965   970   975

Ile Gln Pro Ser Val Val Ile Gly His Ser Leu Gly Glu Tyr Ala Ala
        980   985   990

Leu Gln Ala Ala Gly Val Leu Ser Ile Ala Asp Thr Ile Tyr Leu Val
        995   1000   1005

Gly Lys Arg Ala Gln Leu Leu Glu Gln Lys Cys Thr Ala Gly Thr His
    1010   1015   1020

Ala Met Leu Ala Val Arg Ser Pro Val Gly Gly Leu Gln Asp Val Val
1025   1030   1035   1040

Ala Asn Ser His Gly Lys Ile Glu Asn Cys Gly Ile Asn Gly Val Ser
            1045   1050   1055

Asp Thr Val Leu Ser Gly Thr Met Gly Asp Ile Asp Thr Val Ala Gln
            1060   1065   1070

Lys Leu Ala Asp Ala Gly Gln Lys Cys Thr Lys Leu Lys Leu Pro Phe
        1075   1080   1085

Ala Phe His Ser Ser Gln Val Asp Pro Ile Leu Ala Asp Phe Glu Lys
        1090   1095   1100

Leu Ala Ser Ser Val Asn Tyr His Pro Pro Arg Val Pro Val Ile Ser
1105   1110   1115   1120

Pro Leu Leu Ser Asp Val Val Ser Val Gly Gly Val Phe Asp Ala Phe
            1125   1130   1135

Tyr Leu Ser Arg His Cys Arg Lys Thr Val Asp Phe Val Gly Gly Leu
        1140   1145   1150

Ser Ala Gly Met Ser Thr Ala Thr Ile Ser Asp Thr Ser Leu Trp Leu
    1155   1160   1165

Glu Val Gly Gly His Pro Leu Cys Ala Ser Met Ile Lys Ser Cys Leu
    1170   1175   1180

Ser Val Pro Thr Leu Ala Thr Met Arg Arg Asp Glu Asp Pro Trp Lys
1185   1190   1195   1200

Ile Ile Ser Ala Ser Met Ala Gly Leu Tyr Thr Ala Gly Lys Ser Leu
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Asn Trp Asp Ala Phe His Lys Glu Asn Glu Ser Leu Arg Val Leu Asn
              1220   1225   1230

Asp Leu Pro Phe Tyr Gly Phe Asp Glu Lys Asn Tyr Trp Leu Gln Tyr
              1235   1240   1245

Thr Gly Asp Trp Leu Leu Tyr Lys Gly Asp Tyr Pro Lys Ala Ile Ala
              1250   1255   1260

Pro Ala Pro Ala Ala Ala Ala Ala Ala Arg Pro Ala Lys Ala Arg Lys
1265   1270   1275   1280

Tyr Leu Ser Thr Ser Val Gln Gly Ile Val Ser Glu Glu Val Lys Gly
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Lys Thr Val Thr Ile Val Ala Glu Ser Asp Phe Ala His Pro Lys Leu
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Phe Pro Val Ile Ala Gly His Leu Val Asn Gly Ser Gly Leu Cys Pro
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Ser Thr Leu Tyr Ala Asp Met Ala Tyr Thr Leu Gly Gln Leu Gly Val
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Gly Leu Leu Lys Pro Gly Glu Lys Val Asp Ile Asn Ile Gly Thr Met
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Asp Asn Pro Ala Pro Leu Leu Leu Lys Asn Ile Asn Gln Pro Glu Ser
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Gln Ile Val Gln Met Thr Met Lys Ile Asp Leu Asp Ala Arg Lys Ala
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Asp Phe Ala Val Thr Ser Asn Asn Gly Lys Lys Asp Val Thr His Ala
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Lys Cys Val Ile Val Phe Glu Asp Ala Ala Val Trp Lys Glu Gln Trp
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Ser Lys Thr Ser Tyr Leu Ile Gln Ser Arg Ile Asp Met Leu Lys His
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Lys Met Glu Asn Gly Glu Ala Asp Lys Val Ser Arg Ala Met Ala Tyr
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Lys Leu Phe Gly Ala Leu Val Asp Tyr Ala Asp Ile Phe Gln Gly Met
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Gln Asn Val Val Phe Asp Gly Pro Glu Phe Glu Ala Thr Ser Asn Ile
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Lys Phe Arg Ala Gly Pro Asn Asp Gly Asp Phe Tyr Phe Ser Pro Tyr
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Val Xaa Pro Gln Asp Glu Cys Tyr Ile Ser His Gly Trp Ser Ser Leu
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Arg Phe Ile Glu Pro Leu Gln His Asp Gln Gln Tyr Tyr Ala Tyr Leu
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Val Phe Asn Ala Asp Lys Xaa Val Leu Arg Leu Ala Gly Gly Val Arg
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Phe Gln Cys Ile Pro Arg Lys Leu Met Asp Val Met Met Pro Lys Pro
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Lys Ala Asn Ala Lys Ala Ala Ser Pro Ala Ser Ala Thr Pro Lys Ala
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Ala Pro Thr Val Lys Ala Ser Ser Asn Leu Ala Ala Pro Ala Ser Val
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Glu Leu Pro Thr Pro Lys Val Lys Ala Lys Lys Pro Val Lys Ala Gln
        1635   1640   1645

Lys Ile Lys Ala Pro Ala Pro Pro Lys Gln Ala Ser Ser Gly Ser Leu
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Val Val Arg Ala Phe Glu Ile Ile Ala Lys Glu Ile Asp Val Asp Gln
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Ser Glu Leu Asn Asp Asp Ile Gln Trp Ala Asp Met Gly Val Asp Ser
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Glu Val Xaa Ser Thr Leu Phe Thr Asp Tyr Ala Ser Val Gly Ala Leu
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Arg Lys His Leu Ser Gly Met Ser Gly Pro Glu Pro Ile Ala Thr Gly
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Thr Asp Leu Ser Asn Leu Gly Met Asp Ser Leu Met Ala Leu Thr Val
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Leu Ala Asp Asn Pro Thr Leu Ala His Leu Arg Lys Ala Leu Gly Leu
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Gly Pro Tyr Ile Leu Xaa Gly Trp Ser Ala Ser Gly Val Phe Ala Tyr
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Leu Ala Ala Phe Leu Asp Gln Ser His Tyr Val Val Arg Ala Gln Met
         35                  40                  45

Leu Gln Ser Met Asn Thr Val Asp His Lys Leu Ala Arg Thr Ala Asp
     50                  55                  60

Leu Arg Gln Met Val Gln Lys Tyr Val Asp Gly Lys Leu Thr Pro Ala
 65                  70                  75                  80

Phe Arg Thr Ala Leu Val Cys Leu Cys Gln Leu Gly Cys Phe Ile Arg
                 85                  90                  95

Glu Tyr Glu Glu Ser Gly Asn Met Tyr Pro Gln Pro Ser Asp Ser Tyr
             100                 105                 110

Val Leu Gly Phe Cys Met Gly Ser Leu Ala Ala Val Ala Val Ser Cys
         115                 120                 125

Ser Arg Ser Leu Ser Glu Leu Leu Pro Ile Ala Val Gln Thr Val Leu
     130                 135                 140

Ile Ala Phe Arg Leu Gly Leu Cys Ala Leu Glu Met Arg Asp Arg Val
145                 150                 155                 160

Asp Gly Cys Ser Asp Asp Arg Gly Asp Pro Trp Ser Thr Ile Val Trp
             165                 170                 175
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Gly Leu Asp Pro Gln Gln Ala Arg Asp Gln Ile Glu Val Phe Cys Arg
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Thr Thr Asn Val Pro Gln Thr Arg Arg Pro Trp Ile Ser Cys Ile Ser
            195   200   205

Lys Asn Ala Ile Thr Leu Ser Gly Ser Pro Ser Thr Leu Arg Ala Phe
    210   215   220

Cys Ala Met Pro Gln Met Ala Gln His Arg Thr Ala Pro Ile Pro Ile
225   230   235   240

Cys Leu Pro Ala His Asn Gly Ala Leu Phe Thr Gln Ala Asp Ile Thr
            245   250   255

Thr Ile Leu Asp Thr Thr Pro Thr Thr Pro Trp Glu Gln Leu Pro Gly
            260   265   270

Gln Ile Pro Tyr Ile Ser His Val Thr Gly Asn Val Val Gln Thr Ser
            275   280   285

Asn Tyr Arg Asp Leu Ile Glu Val Ala Leu Ser Glu Thr Leu Leu Glu
    290   295   300

Gln Val Arg Leu Asp Leu Val Glu Thr Gly Leu Pro Arg Leu Leu Gln
305   310   315   320

Ser Arg Gln Val Lys Ser Val Thr Ile Val Pro Phe Leu Thr Arg Met
            325   330   335

Asn Glu Thr Met Ser Asn Ile Leu Pro Asp Ser Phe Ile Ser Thr Glu
            340   345   350

Thr Arg Thr Asp Thr Gly Arg Ala Ile Pro Ala Ser Gly Arg Pro Gly
            355   360   365

Ala Gly Lys Cys Lys Leu Ala Ile Val Ser Met Ser Gly Arg Phe Pro
    370   375   380

Glu Ser Pro Thr Thr Glu Ser Phe Trp Asp Leu Leu Tyr Lys Gly Leu
385   390   395   400

Asp Val Cys Lys Glu Val Pro Arg Arg Arg Trp Asp Ile Asn Thr His
            405   410   415

Val Asp Pro Ser Gly Lys Ala Arg Asn Lys Gly Ala Thr Lys Trp Gly
            420   425   430

Cys Trp Leu Asp Phe Ser Gly Asp Phe Asp Pro Arg Phe Phe Gly Ile
            435   440   445

Ser Pro Lys Glu Ala Pro Gln Met Asp Pro Ala Gln Arg Met Ala Leu
    450   455   460

Met Ser Thr Tyr Glu Ala Met Glu Arg Ala Gly Leu Val Pro Asp Thr
465   470   475   480

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Thr Pro Ser Thr Gln Arg Asp Arg Ile Gly Val Phe His Gly Val Thr
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Ser Asn Asp Trp Met Glu Thr Asn Thr Ala Gln Asn Ile Asp Thr Tyr
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Phe Ile Thr Gly Gly Asn Arg Gly Phe Ile Pro Gly Arg Ile Asn Phe
            515             520             525

Cys Phe Glu Phe Ala Gly Pro Ser Tyr Thr Asn Asp Thr Ala Cys Ser
    530             535             540

Ser Ser Leu Ala Ala Ile His Leu Ala Cys Asn Ser Leu Trp Arg Gly
545             550             555             560

Asp Cys Asp Thr Ala Val Ala Gly Gly Thr Asn Met Ile Tyr Thr Pro
            565             570             575

Asp Gly His Thr Gly Leu Asp Lys Gly Phe Phe Leu Ser Arg Thr Gly
            580             585             590

Asn Cys Lys Pro Tyr Asp Asp Lys Ala Asp Gly Tyr Cys Arg Ala Glu
            595             600             605

Gly Val Gly Thr Val Phe Ile Lys Arg Leu Glu Asp Ala Leu Ala Asp
    610             615             620

Asn Asp Pro Ile Leu Gly Val Ile Leu Asp Ala Lys Thr Asn His Ser
625             630             635             640

Ala Met Ser Glu Ser Met Thr Arg Pro His Val Gly Ala Gln Ile Asp
            645             650             655

Asn Met Thr Ala Ala Leu Asn Thr Thr Gly Leu His Pro Asn Asp Phe
            660             665             670

Ser Tyr Ile Glu Met His Gly Thr Gly Thr Gln Val Gly Asp Ala Val
    675             680             685

Glu Met Glu Ser Val Leu Ser Val Phe Ala Pro Ser Glu Thr Ala Arg
    690             695             700

Lys Ala Asp Gln Pro Leu Phe Val Gly Ser Ala Lys Ala Asn Val Gly
705             710             715             720

His Gly Glu Gly Val Ser Gly Val Thr Ser Leu Ile Lys Val Leu Met
            725             730             735

Met Met Gln His Asp Thr Ile Pro Pro His Cys Gly Ile Lys Pro Gly
            740             745             750

Ser Lys Ile Asn Arg Asn Phe Pro Asp Leu Gly Ala Arg Asn Val His
    755             760             765

Ile Ala Phe Glu Pro Lys Pro Trp Pro Arg Thr His Thr Pro Arg Arg
    770             775             780
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Val Leu Ile Asn Asn Phe Ser Ala Ala Gly Gly Asn Thr Ala Leu Ile
785   790   795   800

Val Glu Asp Ala Pro Glu Arg His Trp Pro Thr Glu Lys Asp Pro Arg
                805   810   815

Ser Ser His Ile Val Ala Leu Ser Ala His Val Gly Ala Ser Met Lys
            820   825   830

Thr Asn Leu Glu Arg Leu His Gln Tyr Leu Leu Lys Asn Pro His Thr
        835   840   845

Asp Leu Ala Gln Leu Ser Tyr Thr Thr Thr Ala Arg Arg Trp His Tyr
    850   855   860

Leu His Arg Val Ser Val Thr Gly Ala Ser Val Glu Glu Val Thr Arg
865   870   875   880

Lys Leu Glu Met Ala Ile Gln Asn Gly Asp Gly Val Ser Arg Pro Lys
            885   890   895

Ser Lys Pro Lys Ile Leu Phe Ala Phe Thr Gly Gln Gly Ser Gln Tyr
        900   905   910

Ala Thr Met Gly Lys Gln Val Tyr Asp Ala Tyr Pro Ser Phe Arg Glu
        915   920   925

Asp Leu Glu Lys Phe Asp Arg Leu Ala Gln Ser His Gly Phe Pro Ser
    930   935   940

Phe Leu His Val Cys Thr Ser Pro Lys Gly Asp Val Glu Glu Met Ala
945   950   955   960

Pro Val Val Val Gln Leu Ala Ile Thr Cys Leu Gln Met Ala Leu Thr
            965   970   975

Asn Leu Met Thr Ser Phe Gly Ile Arg Pro Asp Val Thr Val Gly His
        980   985   990

Ser Leu Gly Glu Phe Ala Ala Leu Tyr Ala Ala Gly Val Leu Ser Ala
        995   1000   1005

Ser Asp Val Val Tyr Leu Val Gly Gln Arg Ala Glu Leu Leu Gln Glu
    1010   1015   1020

Arg Cys Gln Arg Gly Thr His Ala Met Leu Ala Val Lys Ala Thr Pro
1025   1030   1035   1040

Glu Ala Leu Ser Gln Trp Ile Gln Asp His Asp Cys Glu Val Ala Cys
            1045   1050   1055

Ile Asn Gly Pro Glu Asp Thr Val Leu Ser Gly Thr Thr Lys Asn Val
        1060   1065   1070

Ala Glu Val Gln Arg Ala Met Thr Asp Asn Gly Ile Lys Cys Thr Leu
    1075   1080   1085

Leu Lys Leu Pro Phe Ala Phe His Ser Ala Gln Val Gln Pro Ile Leu
    1090   1095   1100

Asp Asp Phe Glu Ala Leu Ala Gln Gly Ala Thr Phe Ala Lys Pro Gln
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Leu Leu Ile Leu Ser Pro Leu Leu Arg Thr Glu Ile His Glu Gln Gly
              1125   1130   1135

Val Val Thr Pro Ser Tyr Val Ala Gln His Cys Arg His Thr Val Asp
              1140   1145   1150

Met Ala Gln Ala Leu Arg Ser Ala Arg Glu Lys Gly Leu Ile Asp Asp
              1155   1160   1165

Lys Thr Leu Val Ile Glu Leu Gly Pro Lys Pro Leu Ile Ser Gly Met
    1170   1175   1180

Val Lys Met Thr Leu Gly Asp Lys Ile Ser Thr Leu Pro Thr Leu Ala
1185   1190   1195   1200

Pro Asn Lys Ala Ile Trp Pro Ser Leu Gln Lys Ile Leu Thr Ser Val
              1205   1210   1215

Tyr Thr Gly Gly Trp Asp Ile Asn Trp Lys Lys Tyr His Ala Pro Phe
              1220   1225   1230

Ala Ser Ser Gln Lys Val Val Asp Leu Pro Ser Tyr Gly Trp Asp Leu
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Lys Asp Tyr Tyr Ile Pro Tyr Gln Gly Asp Trp Cys Leu His Arg His
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Gln Gln Asp Cys Lys Cys Ala Ala Pro Gly His Glu Ile Lys Thr Ala
1265   1270   1275   1280

Asp Tyr Gln Val Pro Pro Glu Ser Thr Pro His Arg Pro Ser Lys Leu
              1285   1290   1295

Asp Pro Ser Lys Glu Ala Phe Pro Glu Ile Lys Thr Thr Thr Thr Leu
              1300   1305   1310

His Arg Val Val Glu Glu Thr Thr Lys Pro Leu Gly Ala Thr Leu Val
    1315   1320   1325

Val Glu Thr Asp Ile Ser Arg Lys Asp Val Asn Gly Leu Ala Arg Gly
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His Leu Val Asp Gly Ile Pro Leu Cys Thr Pro Ser Phe Tyr Ala Asp
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Ile Ala Met Gln Val Gly Gln Tyr Ser Met Gln Arg Leu Arg Ala Gly
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His Pro Gly Ala Gly Ala Ile Asp Gly Leu Val Asp Val Ser Asp Met
              1380   1385   1390

Val Val Asp Lys Ala Leu Val Pro His Gly Lys Gly Pro Gln Leu Leu
   1395   1400   1405

Arg Thr Thr Leu Thr Met Glu Trp Pro Pro Lys Ala Ala Ala Thr Thr
   1410   1415   1420

Arg Ser Ala Lys Val Lys Phe Ala Thr Tyr Phe Ala Asp Gly Lys Leu
1425   1430   1435   1440

Asp Thr Glu His Ala Ser Cys Thr Val Arg Phe Thr Ser Asp Ala Gln
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Leu Lys Ser Leu Arg Arg Ser Val Ser Glu Tyr Lys Thr His Ile Arg
       1460   1465   1470

Gln Leu His Asp Gly His Ala Lys Gly Gln Phe Met Arg Tyr Asn Arg
     1475   1480   1485

Lys Thr Gly Tyr Lys Leu Met Ser Ser Met Ala Arg Phe Asn Pro Asp
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Tyr Met Leu Leu Asp Tyr Leu Val Leu Asn Glu Ala Glu Asn Glu Ala
1505   1510   1515   1520

Ala Ser Gly Val Asp Phe Ser Leu Gly Ser Ser Glu Gly Thr Phe Ala
      1525   1530   1535

Ala His Pro Ala His Val Asp Ala Ile Thr Gln Val Ala Gly Phe Ala
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Met Asn Ala Asn Asp Asn Val Asp Ile Glu Lys Gln Val Tyr Val Asn
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His Gly Trp Asp Ser Phe Gln Ile Tyr Gln Pro Leu Asp Asn Ser Lys
   1570   1575   1580

Ser Tyr Gln Val Tyr Thr Lys Met Gly Gln Ala Lys Glu Asn Asp Leu
1585   1590   1595   1600

Val His Gly Asp Val Val Val Leu Asp Gly Glu Gln Ile Val Ala Phe
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Phe Arg Gly Leu Thr Leu Arg Ser Val Pro Arg Gly Ala Leu Arg Val
      1620   1625   1630

Val Leu Gln Thr Thr Val Lys Lys Ala Asp Arg Gln Leu Gly Phe Lys
    1635   1640   1645

Thr Met Pro Ser Pro Pro Pro Thr Thr Thr Met Pro Ile Ser Pro
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Tyr Lys Pro Ala Asn Thr Gln Val Ser Ser Gln Ala Ile Pro Ala Glu
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Ala Thr His Ser His Thr Pro Pro Gln Pro Lys His Ser Pro Val Pro
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Glu Thr Ala Gly Ser Ala Pro Ala Ala Lys Gly Val Gly Val Ser Asn
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Glu Lys Leu Asp Ala Val Met Arg Val Val Ser Glu Glu Ser Gly Ile
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Ala Leu Glu Glu Leu Thr Asp Asp Ser Asn Phe Ala Asp Met Gly Ile
    1730              1735              1740

Asp Ser Leu Ser Ser Met Val Ile Gly Ser Arg Phe Arg Glu Asp Leu
1745              1750              1755              1760

Gly Leu Asp Leu Gly Pro Glu Phe Ser Leu Phe Ile Asp Cys Thr Thr
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Val Arg Ala Leu Lys Asp Phe Met Leu Gly Ser Gly Asp Ala Gly Ser
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Gly Ser Asn Val Glu Asp Pro Pro Ser Ala Thr Pro Gly Ile Asn
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Pro Glu Thr Asp Trp Ser Ser Ser Ala Ser Asp Ser Ile Phe Ala Ser
    1810              1815              1820

Glu Asp His Gly His Ser Ser Glu Ser Gly Ala Asp Thr Gly Ser Pro
1825              1830              1835              1840

Pro Ala Leu Asp Leu Lys Pro Tyr Cys Arg Pro Ser Thr Ser Val Val
         1845              1850              1855

Leu Gln Gly Leu Pro Met Val Ala Arg Lys Thr Leu Phe Met Leu Pro
         1860              1865              1870

Asp Gly Gly Gly Ser Ala Phe Ser Tyr Ala Ser Leu Pro Arg Leu Lys
         1875              1880              1885

Ser Asp Thr Ala Val Val Gly Leu Asn Cys Pro Tyr Ala Arg Asp Pro
    1890              1895              1900

Glu Asn Met Asn Cys Thr His Gly Ala Met Ile Glu Ser Phe Cys Asn
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Glu Ile Arg Arg Arg Gln Pro Arg Gly Pro Tyr His Leu Gly Gly Trp
         1925              1930              1935

Ser Ser Gly Gly Ala Phe Ala Tyr Val Val Ala Glu Ala Leu Val Asn
         1940              1945              1950

Gln Gly Glu Glu Val His Ser Leu Ile Ile Ile Asp Ala Pro Ile Pro
    1955              1960              1965

Gln Ala Met Glu Gln Leu Pro Arg Ala Phe Tyr Glu His Cys Asn Ser
    1970              1975              1980

Ile Gly Leu Phe Ala Thr Gln Pro Gly Ala Ser Pro Asp Gly Ser Thr
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Met Leu Asp Tyr Lys Leu Ala Pro Leu His Ala Arg Arg Met Pro Lys
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Val Gly Ile Val Trp Ala Ala Asp Thr Val Met Asp Glu Arg Asp Ala
              2035                2040                2045

Pro Lys Met Lys Gly Met His Phe Met Ile Gln Lys Arg Thr Glu Phe
    2050                2055                2060

Gly Pro Asp Gly Trp Asp Thr Ile Met Pro Gly Ala Ser Phe Asp Ile
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Leu Ser Ser Phe Leu Gln Arg Ser Tyr His Ala Val Arg Gln Glu Ile
          35                40                45

Ser His Leu Pro Pro Ser Glu Arg Ser Thr Phe Pro Arg Phe Thr Ser
    50                55                60

Ile Gly Asp Leu Leu Ala Arg His Cys Glu Ser Pro Gly Asn Pro Ala
65                70                75                80

Ile Glu Ser Val Leu Thr Cys Ile Tyr Gln Leu Gly Cys Phe Ile Asn
              85                90                95

Tyr Tyr Gly Asp Leu Gly His Thr Phe Pro Ser His Ser Gln Ser Gln
          100               ·105               110

Leu Val Gly Leu Cys Thr Gly Leu Leu Ser Cys Ala Ala Val Ser Cys
          115               120               125

Ala Ser Asn Ile Gly Glu Leu Leu Lys Pro Ala Val Glu Val Val Val
    130               135               140

Val Ala Leu Arg Leu Gly Leu Cys Val Tyr Arg Val Arg Lys Leu Phe
```

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145                   150                   155                   160

Gly Gln Asp Gln Ala Ala Pro Leu Ser Trp Ser Ala Leu Val Ser Gly
            165                 170                 175

Leu Ser Glu Ser Glu Gly Thr Ser Leu Ile Asp Lys Phe Thr Arg Arg
            180                 185                 190

Asn Val Ile Pro Pro Ser Ser Arg Pro Tyr Ile Ser Ala Val Cys Ala
            195                 200                 205

Asn Thr Leu Thr Ile Ser Gly Pro Pro Val Val Leu Asn Gln Phe Leu
    210                 215                 220

Asp Thr Phe Ile Ser Gly Lys Asn Lys Ala Val Met Val Pro Ile His
225                 230                 235                 240

Gly Pro Phe His Ala Ser His Leu Tyr Glu Lys Arg Asp Val Glu Trp
            245                 250                 255

Ile Leu Lys Ser Cys Asn Val Glu Thr Ile Arg Asn His Lys Pro Arg
            260                 265                 270

Ile Pro Val Leu Ser Ser Asn Thr Gly Glu Leu Ile Val Val Glu Asn
            275                 280                 285

Met Glu Gly Phe Leu Lys Ile Ala Leu Glu Glu Ile Leu Leu Arg Gln
    290                 295                 300

Met Ser Trp Asp Lys Val Thr Asp Ser Cys Ile Ser Ile Leu Lys Ser
305                 310                 315                 320

Val Gly Asp Asn Lys Pro Lys Lys Leu Leu Pro Ile Ser Ser Thr Ala
            325                 330                 335

Thr Gln Ser Leu Phe Asn Ser Leu Lys Lys Ser Asn Leu Val Asn Ile
            340                 345                 350

Glu Val Asp Gly Gly Ile Ser Asp Phe Ala Ala Glu Thr Gln Leu Val
            355                 360                 365

Asn Gln Thr Gly Arg Ala Glu Leu Ser Lys Ile Ala Ile Ile Gly Met
    370                 375                 380

Ser Gly Arg Phe Pro Glu Ala Asp Ser Pro Gln Asp Phe Trp Asn Leu
385                 390                 395                 400

Leu Tyr Lys Gly Leu Asp Val His Arg Lys Val Pro Glu Asp Arg Trp
            405                 410                 415

Asp Ala Asp Ala His Val Asp Leu Thr Gly Thr Ala Thr Asn Thr Ser
            420                 425                 430

Lys Val Pro Tyr Gly Cys Trp Ile Arg Glu Pro Gly Leu Phe Asp Pro
            435                 440                 445

Arg Phe Phe Asn Met Ser Pro Arg Glu Ala Leu Gln Ala Asp Pro Ala
```

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          450                    455                      460

Gln Arg Leu Ala Leu Leu Thr Ala Tyr Glu Ala Leu Glu Gly Ala Gly
465                 470                 475                 480

Phe Val Pro Asp Ser Thr Pro Ser Thr Gln Arg Asp Arg Val Gly Ile
                485                 490                 495

Phe Tyr Gly Met Thr Ser Asp Asp Tyr Arg Glu Val Asn Ser Gly Gln
            500                 505                 510

Asp Ile Asp Thr Tyr Phe Ile Pro Gly Gly Asn Arg Ala Phe Thr Pro
            515                 520                 525

Gly Arg Ile Asn Tyr Tyr Phe Lys Phe Ser Gly Pro Ser Val Ser Val
    530                 535                 540

Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Ile His Leu Ala Cys Asn
545                 550                 555                 560

Ser Ile Trp Arg Asn Asp Cys Asp Thr Ala Ile Thr Gly Gly Val Asn
                565                 570                 575

Ile Leu Thr Asn Pro Asp Asn His Ala Gly Leu Asp Arg Gly His Phe
            580                 585                 590

Leu Ser Arg Thr Gly Asn Cys Asn Thr Phe Asp Asp Gly Ala Asp Gly
        595                 600                 605

Tyr Cys Arg Ala Asp Gly Val Gly Thr Val Val Leu Lys Arg Leu Glu
    610                 615                 620

Asp Ala Leu Ala Asp Asn Asp Pro Ile Leu Gly Val Ile Asn Gly Ala
625                 630                 635                 640

Tyr Thr Asn His Ser Ala Glu Ala Val Ser Ile Thr Arg Pro His Val
            645                 650                 655

Gly Ala Gln Ala Phe Ile Phe Lys Lys Leu Leu Asn Glu Ala Asn Val
            660                 665                 670

Asp Pro Lys Asn Ile Ser Tyr Ile Glu Met His Gly Thr Gly Thr Gln
        675                 680                 685

Ala Gly Asp Ala Val Glu Met Gln Ser Val Leu Asp Val Phe Ala Pro
    690                 695                 700

Asp His Arg Arg Gly Pro Gly Gln Ser Leu His Leu Gly Ser Ala Lys
705                 710                 715                 720

Ser Asn Ile Gly His Gly Glu Ser Ala Ser Gly Val Thr Ser Leu Val
            725                 730                 735

Lys Val Leu Leu Met Met Lys Glu Asn Met Ile Pro Pro His Cys Gly
            740                 745                 750

Ile Lys Thr Lys Ile Asn His Asn Phe Pro Thr Asp Leu Ala Gln Arg
```

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          755                    760                    765

Asn Val His Ile Ala Leu Gln Pro Thr Ala Trp Asn Arg Pro Ser Phe
    770                    775                    780

Gly Lys Arg Gln Ile Phe Leu Asn Asn Phe Ser Ala Ala Gly Gly Asn
785                    790                    795                    800

Thr Ala Leu Leu Leu Glu Asp Gly Pro Val Ser Asp Pro Glu Gly Glu
                805                    810                    815

Asp Lys Arg Arg Thr His Val Ile Thr Leu Ser Ala Arg Ser Gln Thr
                820                    825                    830

Ala Leu Gln Asn Asn Ile Asp Ala Leu Cys Gln Tyr Ile Ser Glu Gln
        835                    840                    845

Glu Lys Thr Phe Gly Val Lys Asp Ser Asn Ala Leu Pro Ser Leu Ala
    850                    855                    860

Tyr Thr Thr Thr Ala Arg Arg Ile His His Pro Phe Arg Val Thr Ala
865                    870                    875                    880

Ile Gly Ser Ser Phe Gln Glu Met Arg Asp Ser Leu Ile Ala Ser Ser
                885                    890                    895

Arg Lys Glu Phe Val Ala Val Pro Ala Lys Thr Pro Gly Ile Gly Phe
                900                    905                    910

Leu Phe Thr Gly Gln Gly Ala Gln Tyr Ala Ala Met Gly Lys Gln Leu
                915                    920                    925

Tyr Glu Asp Cys Ser His Phe Arg Ser Ala Ile Glu His Leu Asp Cys
    930                    935                    940

Ile Ser Gln Gly Gln Asp Leu Pro Ser Ile Leu Pro Leu Val Asp Gly
945                    950                    955                    960

Ser Leu Pro Leu Ser Glu Leu Ser Pro Val Val Val Gln Leu Gly Thr
                965                    970                    975

Thr Cys Val Gln Met Ala Leu Ser Ser Phe Trp Ala Ser Leu Gly Ile
                980                    985                    990

Thr Pro Ser Phe Val Leu Gly His Ser Leu Gly Asp Phe Ala Ala Met
                995                    1000                   1005

Asn Ala Ala Gly Val Leu Ser Thr Ser Asp Thr Ile Tyr Ala Cys Gly
    1010                   1015                   1020

Arg Arg Ala Gln Leu Leu Thr Glu Arg Cys Gln Pro Gly Thr His Ala
1025                   1030                   1035                   1040

Met Leu Ala Ile Lys Ala Pro Leu Val Glu Val Lys Gln Leu Leu Asn
                1045                   1050                   1055

Glu Lys Val His Asp Met Ala Cys Ile Asn Ser Pro Ser Glu Thr Val
```

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              1060                1065                1070

Ile Ser Gly Pro Lys Ser Ser Ile Asp Glu Leu Ser Arg Ala Cys Ser
      1075                1080                1085

Glu Lys Gly Leu Lys Ser Thr Ile Leu Thr Val Pro Tyr Ala Phe His
    1090                1095                1100

Ser Ala Gln Val Glu Pro Ile Leu Glu Asp Leu Glu Lys Ala Leu Gln
1105                1110                1115                1120

Gly Ile Thr Phe Asn Lys Pro Ser Val Pro Phe Val Ser Ala Leu Leu
          1125                1130                1135

Gly Glu Val Ile Thr Glu Ala Gly Ser Asn Ile Leu Asn Ala Glu Tyr
      1140                1145                1150

Leu Val Arg His Cys Arg Glu Thr Val Asn Phe Leu Ser Ala Phe Glu
      1155                1160                1165

Ala Val Arg Asn Ala Lys Leu Gly Gly Asp Gln Thr Leu Trp Leu Glu
    1170                1175                1180

Val Gly Pro His Thr Val Cys Ser Gly Met Val Lys Ala Thr Leu Gly
1185                1190                1195                1200

Pro Gln Thr Thr Thr Met Ala Ser Leu Arg Arg Asp Glu Asp Thr Trp
          1205                1210                1215

Lys Val Leu Ser Asn Ser Leu Ser Ser Leu Tyr Leu Ala Gly Val Asp
      1220                1225                1230

Ile Asn Trp Lys Gln Tyr His Gln Asp Phe Ser Ser Ser His Arg Val
      1235                1240                1245

Leu Pro Leu Pro Thr Tyr Lys Trp Asp Leu Lys Asn Tyr Trp Ile Pro
    1250                1255                1260

Tyr Arg Asn Asn Phe Cys Leu Thr Lys Gly Ser Ser Met Ser Ala Ala
1265                1270                1275                1280

Ser Ala Ser Leu Gln Pro Thr Phe Leu Thr Thr Ser Ala Gln Arg Val
          1285                1290                1295

Val Glu Ser Arg Asp Asp Gly Leu Thr Ala Thr Val Val Val His Asn
      1300                1305                1310

Asp Ile Ala Asp Pro Asp Leu Asn Arg Val Ile Gln Gly His Lys Val
      1315                1320                1325

Asn Gly Ala Ala Leu Cys Pro Ser Ser Leu Tyr Ala Asp Ser Ala Gln
    1330                1335                1340

Thr Leu Ala Glu Tyr Leu Ile Glu Lys Tyr Lys Pro Glu Leu Lys Gly
1345                1350                1355                1360

Ser Gly Leu Asp Val Cys Asn Val Thr Val Pro Lys Pro Leu Ile Ala
```

```
              1365                    1370                    1375

Lys Thr Gly Lys Glu Gln Phe Arg Ile Ser Ala Thr Ala Asn Trp Val
         1380                    1385                    1390

Asp Lys His Val Ser Val Gln Val Phe Ser Val Thr Ala Glu Gly Lys
         1395                    1400                    1405

Lys Leu Ile Asp His Ala His Cys Glu Val Lys Leu Phe Asp Cys Met
    1410                    1415                    1420

Ala Ala Asp Leu Glu Trp Lys Arg Gly Ser Tyr Leu Val Lys Arg Ser
1425                    1430                    1435                    1440

Ile Glu Leu Leu Glu Asn Ser Ala Val Lys Gly Asp Ala His Arg Leu
             1445          .         1450                    1455

Arg Arg Gly Met Val Tyr Lys Leu Phe Ser Ala Leu Val Asp Tyr Asp
             1460                    1465                    1470

Glu Asn Tyr Gln Ser Ile Arg Glu Val Ile Leu Asp Ser Glu His His
         1475                    1480                    1485

Glu Ala Thr Ala Leu Val Lys Phe Gln Ala Pro Gln Ala Asn Phe His
    1490                    1495                    1500

Arg Asn Pro Tyr Trp Ile Asp Ser Phe Gly His Leu Ser Gly Phe Ile
1505                    1510                    1515                    1520

Met Asn Ala Ser Asp Gly Thr Asp Ser Lys Ser Gln Val Phe Val Asn
             1525                    1530                    1535

His Gly Trp Asp Ser Met Arg Cys Leu Lys Lys Phe Ser Ala Asp Val
             1540                    1545                    1550

Thr Tyr Arg Thr Tyr Val Arg Met Gln Pro Trp Arg Asp Ser Ile Trp
         1555                    1560                    1565

Ala Gly Asn Val Tyr Ile Phe Glu Gly Asp Asp Ile Ile Ala Val Phe
    1570                    1575                    1580

Gly Gly Val Lys Phe Gln Ala Leu Ser Arg Lys Ile Leu Asp Ile Ala
1585                    1590                    1595                    1600

Leu Pro Pro Ala Gly Leu Ser Lys Ala Gln Thr Ser Pro Ile Gln Ser
             1605                    1610                    1615

Ser Ala Pro Gln Lys Pro Ile Glu Thr Ala Lys Pro Thr Ser Arg Pro
         1620                    1625                    1630

Ala Pro Pro Val Thr Met Lys Ser Phe Val Lys Lys Ser Ala Gly Pro
    1635                    1640                    1645

Ser Val Val Val Arg Ala Leu Asn Ile Leu Ala Ser Glu Val Gly Leu
    1650                    1655                    1660

Ser Glu Ser Asp Met Ser Asp Asp Leu Val Phe Ala Asp Tyr Gly Val
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1665   1670   1675   1680

Asp Ser Leu Leu Ser Leu Thr Val Thr Gly Lys Tyr Arg Glu Glu Leu
                  1685   1690   1695

Asn Leu Asp Met Asp Ser Ser Val Phe Ile Glu His Pro Thr Val Gly
             1700   1705   1710

Asp Phe Lys Arg Phe Val Thr Gln Leu Ser Pro Ser Val Ala Ser Asp
          1715   1720   1725

Ser Ser Ser Thr Asp Arg Glu Ser Glu Tyr Ser Phe Asn Gly Asp Ser
     1730   1735   1740

Cys Ser Gly Leu Ser Ser Pro Ala Ser Pro Gly Thr Val Ser Pro Pro
1745   1750   1755   1760

Asn Glu Lys Val Ile Gln Ile His Glu Asn Gly Thr Met Lys Glu Ile
             1765   1770   1775

Arg Ala Ile Ile Ala Asp Glu Ile Gly Val Ser Ala Asp Glu Ile Lys
             1780   1785   1790

Ser Asp Glu Asn Leu Asn Glu Leu Gly Met Asp Ser Leu Leu Ser Leu
     1795   1800   1805

Thr Val Leu Gly Lys Ile Arg Glu Ser Leu Asp Met Asp Leu Pro Gly
     1810   1815   1820

Glu Phe Phe Ile Glu Asn Gln Thr Leu Asp Gln Ile Glu Thr Ala Leu
1825   1830   1835   1840

Asp Leu Lys Pro Lys Ala Val Pro Thr Ala Val Pro Gln Ser Gln Pro
             1845   1850   1855

Ile Thr Leu Pro Gln Ser Gln Ser Thr Lys Gln Leu Ser Thr Arg Pro
          1860   1865   1870

Thr Ser Ser Ser Asp Asn His Pro Pro Ala Thr Ser Ile Leu Leu Gln
     1875   1880   1885

Gly Asn Pro Arg Thr Ala Ser Lys Thr Leu Phe Leu Phe Pro Asp Gly
     1890   1895   1900

Ser Gly Ser Ala Thr Ser Tyr Ala Thr Ile Pro Gly Val Ser Pro Asn
1905   1910   1915   1920

Val Ala Val Tyr Gly Leu Asn Cys Pro Tyr Met Lys Ala Pro Glu Lys
             1925   1930   1935

Leu Thr Cys Ser Leu Asp Ser Leu Thr Thr Pro Tyr Leu Ala Glu Ile
          1940   1945   1950

Arg Arg Arg Gln Pro Thr Gly Pro Tyr Asn Leu Gly Gly Trp Ser Gln
     1955   1960   1965

Ala Gly Ser Ala His Thr Thr Arg His Ala Ser Ser Tyr Cys Ser Arg

1970   1975   1980

Ala Lys
1985

<210> 14
<211> 53
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 14
atgaagcttg gggtttgagg gccaatggaa cgaaactagt gtaccacttg acc   53

<210> 15
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 15
gacagatctg gcgccattcg ccattcag   28

<210> 16
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 16
ggaatcggtc aatacactac   20

<210> 17
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 17
tgtagatctc tattcctttg ccctcggacg agt   33

<210> 18
<211> 35
<212> DNA

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 18
ggccgccacg gatatcttgg ccaaagaatt cctgg   35

<210> 19
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 19
cggtgcctat agaaccggtt tcttaaggac cgcgc   35

<210> 20
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 20
gayccmgtty ttyaayatg   19

<210> 21
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 21
gtccgtccrt gcatytc   17

<210> 22
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 22
ataagaatgc ggccgcaatg gccctcgaaa cagc   34

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<210> 23
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 23
aaatggcgcg ccgcgcccag aatgacacc                              29


<210> 24
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 24
tgccacctgt agtctgcaat cag                                    23


<210> 25
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 25
tgactaaccc tgacaacttc gctg                                   24


<210> 26
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 26
ccaggatccg actgctcag                                         19


<210> 27
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 27
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ctacatcgag atgcacggca c   21

<210> 28
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> n is a, c, g, t, unknown, or other

<220>
<221> misc_feature
<222> (11)..(11)
<223> n is a, c, g, t, unknown, or other

<400> 28
ngtcgaswga nawgaa   16

<210> 29
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<220>
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<222> (3)..(3)
<223> n is a, c, g, t, unknown, or other

<220>
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<222> (11)..(11)
<223> n is a, c, g, t, unknown, or other

<400> 29
gtncgaswca nawgtt   16

<210> 30
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<220>
<221> misc_feature

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<222>  (5)..(5)
<223>  n is a, c, g, t, unknown, or other

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<222>  (10)..(10)
<223>  n is a, c, g, t, unknown, or other

<220>
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<222>  (13)..(13)
<223>  n is a, c, g, t, unknown, or other

<400> 30
wgtgnagwan canaga                                                        16


<210> 31
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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<222>  (1)..(1)
<223>  n is a, c, g, t, unknown, or other

<400> 31
ntcgastwts gwgtt                                                         15


<210> 32
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
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<223>  n is a, c, g, t, unknown, or other

<220>
<221>  misc_feature
<222>  (10)..(10)
<223>  n is a, c, g, t, unknown, or other

<400> 32
tgwgnagwan casaga                                                        16


<210> 33
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<211> 16
<212> DNA
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<220>
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<220>
<221>  misc_feature
<222>  (10)..(10)
<223>  n is a, c, g, t, unknown, or other

<400> 33
agwgnagwan cawagg                                                16


<210> 34
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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<222>  (7)..(7)
<223>  n is a, c, g, t, unknown, or other

<400> 34
cawcgcngaa sgaa                                                  14


<210> 35
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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<222>  (7)..(7)
<223>  n is a, c, g, t, unknown, or other

<400> 35
tcstcgnact wgga                                                 14


<210> 36
<211> 23
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 36
ttgttactgg agaggtaatg aag   23

<210> 37
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 37
tgagacagat ctcgcgagcc ctc   23

<210> 38
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 38
atgtctccaa aggaagctga gc   22

<210> 39
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 39
tcgagtgatg gatactgctt cg   22

<210> 40
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 40
cggctacact agaaggacag tatttggta   29

<210> 41
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 41
gtcaggcaac tatggatgaa cgaaatagac   30

<210> 42
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 42
acccatctca taaataacgt catgc   25

<210> 43
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 43
caactctatc agagcttggt tga   23

<210> 44
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 44
cccgaattca tgagctttgt tcaaataagg   30

<210> 45
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 45
ttattctaga ttttccatgg gaatggatac agtcttacg   39

<210> 46
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 46
cgccaccatg gtgagcaagg gcgaggagct gtt   33

<210> 47
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 47
tatgatctag agtcgcggcc gctttacttg tacagctcg   39

<210> 48
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 48
gcttctaatc cgtactagtg gatca   25

<210> 49
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 49
ctttgatctt ttctacgggg tctga   25